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025264
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IM22/0409

EXAMINER

NGUYEN, T

| ART UNIT | PAPER NUMBER |
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1764

DATE MAILED: 04/09/01

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/206,216

Applicant(s)

DATH ET AL.

Examiner

Tam M. Nguyen

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4-10, 12-14, 16-20, 24, and 27-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-10, 12-14, 16-20, 24, and 27-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Response to Amendment

The rejection of claims 1, 2, 4-6, 9, 10, 13, 14, 16, and 27 under 35 USC § 103 over EP 0534142 is withdrawn by the examiner in view of the amendment filed on February 14, 2001.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 7-10, 12-14, 24, and 27-33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of copending Application No. 09/206,208. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an MFI crystalline silicate catalyst. However, the crystalline catalyst of the present claimed process has the same characteristics as

the MFI crystalline silicate catalyst of the process of claims 1-10. Therefore, the present claimed catalyst is the MFI crystalline silicate.

Claims 1, 2, 4-10, 12-14, 16, 17, 20, 24, and 27-33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,207. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an MFI crystalline silicate catalyst or ZSM-5 and does not disclose that the feed contains at least one sulfur, nitrogen, and/or oxygen derivative impurity. However, the crystalline catalyst of the present claimed process has the same characteristics as the MFI which is ZSM-5 of the process of claims 1-16. Therefore, the present claimed catalyst is ZSM-5 and it would be expected that the results would be the same when using the feed of claims 1-16 for the present claimed process because both claimed processes use the same catalyst and operate under the same conditions.

Claims 1, 2, 4-10, 12-14, 24, and 27-33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,218. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an **MFI** crystalline silicate catalyst. However, the crystalline catalyst of the present claimed process has the same characteristics as

the MFI crystalline silicate catalyst of the process of claims 1-16. Therefore, the present claimed catalyst is the MFI crystalline silicate.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7-10, 12, and 27-32, are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0109060.

The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure. The process is conducted at a temperature of from 400⁰ C to 600⁰ C, at a substantially atmospheric pressure, and at a space velocity of from 5 to 200 h⁻¹. The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50 hr⁻¹. If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50 hr⁻¹. The examples indicate selectivity of C₄ saturated compounds of less than 5 wt. %. Therefore, at least 95% of the C₂ and C₃ compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the

Art Unit: 1764

feed and product are within $\pm 15\%$ of each other. It is noted that the reference does not specifically disclose a ratio of silicon/aluminum between 180 and 1000 or between 350 and 500. However, the reference discloses that the catalyst has a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio equal to or greater than 350 (this is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175). Therefore, the examiner's position is that the claimed ratio of silicon/aluminum is embraced by the reference. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4-6, 13, and 14 are rejected under 35 U.S.C. 103(a) as obvious over EP 0109060.

The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure and having a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio equal to or greater than 350. This is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175. The process is conducted at a temperature of from 400°C to 600°C , at a substantially atmospheric pressure, and at a space velocity of from 5 to 200 h^{-1} . The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50 hr^{-1} . If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50 hr^{-1} . The examples indicate selectivity of C_4 -saturated compounds of less than 5 wt %. Therefore, at least 95% of the C_2 and C_3 compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within ± 15

Art Unit: 1764

% of each other. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

Regarding claims 1, and 28-32, the EP reference does not specifically disclose that the atomic ratio of silicon to aluminum is from 180 to 1000 or 300-500. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP catalyst by using a catalyst having an atomic ratio of silicon to aluminum of 180 or between 300-500 because the EP reference discloses that a catalyst having an atomic ratio of silicon to aluminum greater than 175 can be used in the process.

Regarding claims 4-6, the reference does not disclose that the feedstock comprises light cracked naphtha or is selected from a C₄ or C₅ cut from a steam cracker. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by having the feedstock from a source as claimed because the claimed feeds are chemically and physically similar to the feeds disclosed in EP 0109060 and therefore would be expected to behave similarly in the process of EP 019060 as the disclosed feeds.

Regarding claims 13 and 14, the reference does not specifically disclose the olefin partial pressures. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by utilizing the claimed olefin partial pressure because the EP 0109060 reference discloses pressures that overlap those claimed and discloses that the pressure is a result effective variable.

Art Unit: 1764

Regarding claim 33, the reference does not specifically disclose that the catalyst is a monoclinic silicalite. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst of EP 0109060 by using a catalyst having monoclinic crystalline structure because it would be expected that the outcome would be the same or similar when using a catalyst having monoclinic crystalline structure because catalyst of EP 0109060 is selected from a group of crystalline molecular sieves and silica-containing crystalline.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0109060 as applied to claims 1, 2, 4-6, 13, and 14 above, and further in view of Cosyns et al. (5,306,852).

The EP 0109060 reference does not specifically disclose that the feed contains dienes, and does not disclose the step of hydrogenation of dienes.

Cosyns discloses a hydrogenation process in which a diolefin (or diene) containing hydrocarbon fraction produced by steam cracking or other cracking processes is hydrogenated. The dienes are converted into mono-olefins by contacting with a hydrogenation catalyst. (See abstract)

Regarding claims 16, 17 and 20, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by utilizing a feed similar to the claimed feed in the process of EP 0109060 and hydrogenating dienes in the feed because Cosyns discloses that dienes (undesirable substances) will be converted to mono-olefins in a hydrogenation process. Also, it would be expected that the

Art Unit: 1764

results would be similar or the same when using the claimed feed in the EP process because of the similarities between the claimed feed and the EP feed.

Regarding claims 18, 19 and 20, Cosyns does not specifically disclose the LHSV of the feedstock and the hydrogenation operating conditions. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Cosyns process by utilizing the LHSV and the operating conditions as claimed because Cosyns utilizes a hydrogenation catalyst to convert dienes in a hydrocarbon stream, which is from the same sources as claimed, to mono-olefins. Therefore, it would be expected that the results would be similar or the same when operating the Cosyns process under the claimed conditions.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 and Cosyns et al. (5,306,852) as applied to claim 20, and further in view of Gajda et al. (5,522,984).

EP 010960 reference does not specifically disclose the step of pretreating the catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Gajda discloses a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by pre-treating the catalyst as taught by Gajda because the Gajda catalyst pretreating step will produce a catalyst having a desirable silicon/aluminum ratio. (See Gajda, col. 3, lines 13-49; col. 4, lines 43-49)

Art Unit: 1764

Alternatively, claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 and Cosyns et al. (5,306,852) as applied to claim 20 above, and further in view of Kuehl et al. (4,954,243).

EP 010960 reference does not specifically disclose the step of pretreating catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Kuehl discloses the dealumination of zeolites which are used in catalytic cracking to result in zeolites that can have silica: alumina mole ratios of 300 or greater. The dealumination can occur by calcination in the presence of water followed by treatment with a complexing agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by dealuminating the zeolite to achieve the desired silicon:aluminum atomic ratio as suggested by Kuehl because the zeolite will exhibit very low coke make thereby allowing very long times on stream between regenerations. (See Kuehl, col. 3, lines 44-65; col. 4, lines 15-28; col. 8, lines 65-68; col. 9, lines 11-17 and 55-68; col. 10, lines 1-5; col. 11, lines 27-68; col. 12, lines 1-7 and 48-58)

Response to Arguments

The argument that the EP '060 reference does not disclose the range of silicon/aluminum atomic ratio as called for in claims 1, 28, 29, 31, and 32 is noted. However, the argument is not persuasive because the EP '060 reference discloses that a catalyst having a silicon/aluminum atomic ratio of at least 175 can be used in the process. Therefore, the examiner maintains that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP catalyst by using a catalyst having an atomic ratio

of silicon to aluminum of 180 or between 300-500 because it would be expected that the results would similar or the same when using the claimed ratio in the EP process because of the similarities between the claimed process and the EP '060 process.

The argument that the EP reference does not disclose the claimed ranges of temperature, pressure, and LHSV is noted. However, the argument is not persuasive because the ranges of temperature, pressure, and LHSV of the EP '060 process overlap the claimed ranges of temperature, pressure, and LHSV. Also, the invention of EP '060 is not limited to its example conditions. Moreover, it has been held by the patent law that the selection of reaction parameters such as temperature and concentration would have been obvious. More particularly, where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller 105 USPQ 233, 255 (CCPA 1955). In re Waite 77 USPQ 586 (CCPA 1984). In re Scherl 70 USPQ 204 (CCPA 1946). In re Irmischer 66 USPQ 314 (ccpa 1945). In re Norman 66 USPQ 308 (CCPA 1945). In re Swenson 56 USPQ 372 (CCPA 1943). In re Sola 25 USPQ 433 (CCPA). In re Dreyfus 24 USPQ 52 (CCPA 1934).

The argument that it is clear that olefin content of the effluent would not be within 15% of the olefin content of the feedstock because the evidence in examples 16-23 and 36 show the effluent would not be within 15% of the olefin content of the feedstock is noted. However, the argument is not persuasive because there are no examples 16-23 and 36 in the EP-0109060 reference.

The argument that the examiner is in error in the assessment of the C₂-C₃ compounds present in the effluent of the '060 patent as olefins is noted. However, the argument is not

Art Unit: 1764

persuasive because even if applicant's calculation of the selectivity of saturated C₄- compounds is correct, the amounts of ethylene and propylene produced in examples 1-6 of the EP '060 reference are obtained when **selecting** the ratio of silicon/aluminum of infinity. Therefore, it would be expected that the at least 90% or 95% of the C₂ and C₃ olefins are present in the product stream of the EP '060 process when one selects the ratio of silicon/aluminum greater than 175 (e.g., 400) as suggested by the EP '060 reference because of the similarities between the claimed process the EP '060 process in term of the feedstock, operating conditions, and catalyst.

The argument that there is no motivation to combine the EP '060 and the Cosyns references because the feedstock in Cosyns is not an olefin-rich stream as called in claim 1 is noted. However, the argument is not persuasive because Cosyns discloses that dienes (undesirable substances) will be converted to mono-olefins in a hydrogenation process. Also, it would be expected that the results would be similar or the same when using the claimed feed in the EP process because of the similarities between the claimed feed and the EP feed.

The argument that the examiner is in error in suggesting that Gajda and Kuehl disclose a pretreating step to produce the desired silicon/aluminum atomic ratio of the catalyst employed in applicants' invention is noted. However, the argument is not persuasive because the Gajda and Kuehl reference disclose a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. The examiner applies the teaching of Gajda and Kuehl to produce a catalyst having a desirable silicon/aluminum ratio such as a ratio of greater than 175 as required by the EP reference. The examiner does not treat the EP catalyst so that the ratio of silicon/aluminum is below the claimed ratio as argued by applicant.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703 308 4311. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-3599 for After Final communications.

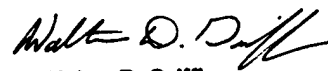
Application/Control Number: 09/206,216

Page 14

Art Unit: 1764

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam Nguyen/ TN
April 5, 2001


Walter D. Griffin
Primary Examiner